Financial Instability and Life Insurance Demand[+]

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Abstract

This paper estimates private life insurance and Kampo demand functions using household-level data provided by the Postal Services Research Institute. The results show that income, children, pension and knowledge factors have a significant effect on the decision as to whether each household purchases life insurance products. The amount of income and financial assets also appear to have significant effect on the purchase of private life insurance and Kampo. However, pension and bankruptcy experience appear only to have an impact on Kampo, while aged (less than 40) and occupation (civil servant) factors affect only private life insurance. Dummy variables representing comparison, knowledge, and bankruptcy experience did not have any significant effect on decisions concerning private life insurance. Simultaneous estimations are also used to examine why households that already have one type of life insurance product (e.g. private life insurance) purchase the other type of life insurance product (e.g. Kampo). The results indicate that income, children, and bankruptcy experience variables are not significant factors when households with private life insurance product decide to purchase additional Kampo. The results also show that a knowledge dummy has a negative impact on additional purchases.

1. Introduction

According to the Japan Institute of Life Insurance's Annual Report, total insurance money held by all Japanese insurance companies, including individual insurance and annuities, reached approximately 1,200 trillion yen (about 11,702 billion US dollars) in FY 2003. This amounts to nearly 24,520 thousand yen per household (about 234,798 US dollars)[1]. Since this represents a significant share of household total expenditure, life insurance is an important item when we address problems with Japanese household expenditure.

A number of researchers have investigated the relationships between life insurance demand and factors such as household income, age, working style, the number of children, and so forth in order to shed light on the demand structure of life insurance products in Japan. For example, Tachibanaki and Shimono (1994) found that the total amount of financial assets, whether a spouse was working,

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[1] The number of households is from Japan's 2004 Basic Register.

and the number of dependents (excepting the spouse) have a positive impact on insurance expenditure. On the other hand, income level and academic background have a negative impact on insurance expenditure. Alternatively, Urata et al. (1999) argued that household income, home ownership, persons aged less than 40, and children have a positive impact on both decisions, and that the amount of financial assets (＋) and spouse working full-time (－) are significant factors affecting insurance expenditure. However, Masui (2000) has argued that risky asset and savings-oriented insurance are complements in that a household may hold both assets simultaneously. Further, the amount of savings-oriented insurance depends on the academic background (graduating from high school), household secondary income, and individual annuities. Finally, Komamura et al. (2000) proved that public pension and protection-oriented insurance are substitutes, while public pension and savings-oriented insurance are complements.

The purpose of this research is to estimate the demand for life insurance in Japan. There are two points of departure of this study from previous work in this area. First, the study examines not only private life insurance products, but also Kampo. We can predict that households which have a greater knowledge of financial institutions, the law and markets usually purchase Kampo. There is no existing research that makes such a prediction. In addition, some households purchase not only Kampo, but also private life insurance products, even though both are strongly substitutable[2]. In this case, what are the differences between households that have already purchased Kampo and do not purchase any insurance products and households, which purchase a private life insurance product?

Second, we use knowledge and experience factors to estimate life insurance demand. Fierce competition has made financial institutions, the legal system and markets very complex. We predict that knowledge and experimentation with financial matters depends upon decisions about asset allocation. However, existing research has not examined such factors. It is therefore not possible to know whether the bankruptcy experience, for example, affects asset allocation[3].

There are several principal findings. First, income, child, pension and knowledge factors have a significant impact on the decision by individuals to purchase either life insurance product. The bankruptcy experience variable seemed to have impact only in the case of Kampo. Second, the level of income and financial assets appears to have significant effect on the purchase of both private life insurance and Kampo. Being aged less than 40 and civil servant occupation factors are shown to only affect the purchase of private life insurance. Third, income, child, and bankruptcy experience factors are not significant when households with private life insurance product purchase Kampo.

[2] According to public comments by the Life Insurance Association of Japan in 2004, Kampo was founded to complement private life insurance products. At that time, Japanese private life insurance firms were very financially poor so that they could not sell proper life insurance products, especially to low-income individuals. Kampo and private life insurance products are now substitutable because private life insurance firms sell many other kinds of life insurance products.

[3] Previous research has not examined these problems because they only arose in conjunction with the dramatic changes in Japanese financial markets in recent years.

Knowledge also has a negative impact on additional purchases. Fourth, the existence of financial instability has little to do with the impact on insurance expenditure, but knowledge factors have some impact on the purchasing decision. However, households that have experienced bankruptcy previously tend to purchase Kampo instead of private life insurance.

The remainder of this paper is organized as follows. Section 2 briefly discusses the background of the Japanese life insurance market. Section 3 introduces the data, estimation method, and explanatory variables. The results are presented in Section 4. In Section 5 we estimate and examine the simultaneous equation models. Some concluding remarks are presented in the final section.

2. Background

There are two main reasons today why each Japanese household has to choose an insurance firm and/or insurance product more carefully than in the past. First, insurance firms compete more fiercely to gain market share since the change in Japanese insurance law in 1996. With these changes, insurance firms could sell more consumer-oriented and differentiated products, so households need to consider the most suitable product from the wide variety available. Second, since 1996 some insurance firms have been bankrupted through this fierce competition. By May 2005, seven life insurance and two non-life insurance firms had been bankrupted. Accordingly, every household has to assess whether the insurance firm that they contract with will remain solvent in the future.

In addition, all Japanese households have the option to purchase life insurance products outside of private life insurance firms. Japan Post sells public life insurance products named “Kampo”. Japan Post is not a private sector entity, but a form of public sector entity. In 2003 Kampo sold amounted to about 185 trillion yen (about 1,769 billion US dollars)[4], a little more than Sumitomo, Japan’s third biggest private life insurance firm[5]. Thus, it is impossible to ignore Kampo when we examine the asset allocation of Japanese households.

Japan Post tends to sell life insurance products that are very similar to those of other private life insurance firms. Since January 2004, Japan Post sells blended life insurance products with whole life and term insurance. This product is sometimes positioned as the main product by the private insurance firms. However, there are several differences between Kampo and private life insurance products. First, Kampo’s insurance money is restricted to under 10 million yen per person. Second, the Japanese government guarantees all insurance money if Japan Post were to go into bankruptcy, whereas private life insurance contracts sometimes fail when an insurance firm bankrupts. Third, Japan Post does not limit joining on the basis of professions. Fourth, Kampo is sold in post offices located across Japan[6].

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[4] See Postal Services in Japan 2004 (annual report), p.14.
[5] Sumitomo life insurance firm had about 176 trillion life insurance amounts in fiscal 2003.
[6] According to Postal Services in Japan 2004 (annual report) (pp.125–126), as of March 31, 2004, there are 24,715 post offices in Japan. All Japanese prefectures (47 prefectures) have more than 200 post

3. Estimation for Life Insurance Demand Function

3.1. The data

This research shed light on some open questions described above using the data offered by the Postal Services Research Institute. At the same time, we also consider Kampo's main role and what Kampo should be in the future. The data were collected by way of a questionnaire. The questionnaire contained very detailed individual information so that we could obtain appropriate data from the database. This database represents insurance money and insurance premiums of private life insurance, Kampo, and cooperative insurance. The number of valid responses was 4,182; a response rate of about 70%. Some 3,273 responses were from household with two members or more, and the remaining 909 from single-person household. In order to protect the privacy of respondents, we only get about 90% out of total, 3,762. Data from households that did not respond were excluded. In addition, we restricted the data in order to satisfy the following conditions: (1) the age of the householder is less than 60, (2) the householder is working. We restricted the data because we would like to focus on households whose requirements for life insurance were relatively high. Through these restrictions, the sample fell to 2,004 valid responses.

3. 2. Equation for Estimation

In this section, we explain the estimation method used for the life insurance demand function. We can divide a household's life insurance purchasing behavior into the following two stages. First, households decide whether to purchase life insurance products. Second, they decide the amount of insurance they decide to purchase. We must be careful that the observed amount of insurance shows only the demand of households who decide to purchase life insurance products. We express this by the following mathematical form:

$$y_i^* = x_i'\boldsymbol{\beta} + u_i \text{、} \quad i = 1,2,\ldots,n. \quad u_i \sim N(0,\sigma^2)$$

$$\begin{cases} y_i = y_i^* & if \quad y_i^* > 0 \\ \quad = 0 & if \quad y_i^* \le 0 \end{cases}$$

In this situation, there exists the estimation bias ($\sigma\lambda(\mathbf{x}_i'\boldsymbol{\beta}/\sigma)$) shown below if we apply ordinary regression method to $y_i > 0$ observation.

$$E(y_i \mid y_i > 0) = \mathbf{x}_i'\boldsymbol{\beta} + E(u_i \mid u_i > -\mathbf{x}_i'\boldsymbol{\beta}) = \mathbf{x}_i'\boldsymbol{\beta} + \sigma\lambda(\mathbf{x}_i'\boldsymbol{\beta}/\sigma)$$

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offices.

Here, $\lambda(\cdot)$ is often called as "inverse Mills ratio" and is shown as

$$\lambda(\mathbf{x}_i'\boldsymbol{\beta}/\sigma) = \phi_i(\mathbf{x}_i'\boldsymbol{\beta}/\sigma)/\Phi_i(\mathbf{x}_i'\boldsymbol{\beta}/\sigma)$$ [7]

If we define $\alpha \equiv \boldsymbol{\beta}/\sigma$, Heckman's two-step method (Heckman (1976), Amemiya (1985), Wooldridge (2002)) is used to estimate the two-stage procedure, as follows:

Step (1): Decision on whether to purchase life insurance products:

Calculate $\hat{\alpha}$, maximum likelihood estimator of α, based on Probit model.

Step (2): (If household decide to purchase life insurance products)

Decision on purchasing amount of insurance purchased:

Using positive observation, regress y_i onto $\mathbf{x}_i$ and $\lambda(\mathbf{x}_i'\hat{\alpha})$.

In this paper, we estimate the above two stages simultaneously using the maximum likelihood method.

3. 3 Explanatory Variables

Based on previous sections, we specify the following explanatory variables.

Step (1): With respect to decision on whether to purchase life insurance products:

Yen amount of income, yen amount of financial assets, occupation of non-household head dummy (1 if some of the member in family except for household head has a job, 0 otherwise), children dummy (1 if household has more than one child, 0 otherwise), metropolitan dummy (1 if household is located in metropolitan area, 0 otherwise), pension dummy (1 if household has more than one pensioner, 0 otherwise), comparison of insurance companies dummy (1 if household compares more than three companies when they purchase life insurance product, 0 otherwise), knowledge on amendment of insurance business law dummy (1 if household knows amendment of insurance business law to allow insurance company to cut guaranteed yields, 0 otherwise), bankruptcy experience dummy (1 if household has experienced bankruptcy of financial institution which they often use, 0 otherwise).

Step (2): With respect to the decision on purchasing an amount of insurance:

Amount of income, amount of financial assets, age of household head, owner-occupied house dummy (1 if household has their house with no loan, 0 otherwise), public officials dummy (1 if occupation of household head is public officials, 0 otherwise), large-scale firm dummy (1 if household head works in large-scale firm with more than 500 employees, 0 otherwise), pension dummy, comparison of insurance companies dummy, knowledge on amendment of insurance business law dummy, bankruptcy experience dummy.

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[7] $\phi_i(\cdot), \Phi_i(\cdot)$ mean density function and distribution function, respectively.

Descriptive statistics are shown in Table 1 and the correlation matrix in Table 2. Note that the original questionnaire survey adopts class value alternatives instead of asking the amount itself. Therefore, we transform class value alternatives into an amount based on class average, and estimate the demand function. In addition, "amount of financial assets" includes "amount of funding saving-based insurance" in the questionnaire. Strictly speaking, we must exclude "amount of funding saving-based insurance" from "amount of financial assets." Unfortunately, such information was not made available. Accordingly, caution must be taken when interpreting the results.

----------Insert Table 1 and Table 2 about here ----------

4. The Results

In this section, we consider the life insurance demand function results shown in Table 3. The left-hand side is the results of the estimation for domestic private life insurance while the right-hand side shows the estimation results for Kampo[8]. In addition, the lower part shows the result for the decision on whether purchasing life insurance products while the upper part shows the result for the decision on purchasing the amount of insurance.

----------Insert Table 3 about here ----------

First, let us examine the estimation results for the life insurance holding function (lower part) and consider the statistically significant variables with respect to both domestic life insurance and Kampo. Both income and children dummy variables have a positive sign and are statistically significant. This is consistent with our expectations. Next, it is rational for a significant positive sign of pension dummy because a pensioner is an aged person and is considered to have a greater demand for life insurance. Knowledge of the insurance business law, which can be regarded as a proxy for financial literacy, has a significant positive sign. This seems to reflect the fact that the household who holds life insurance products tends to have more ample knowledge about financial conditions than a household with no demand.

On the other hand, one distinctive variable that shows a different sign between domestic life insurance and Kampo is the bankruptcy experience dummy. This has a positive significant sign only

[8] In the questionnaire survey, private life insurance companies are classified into two categories, domestic and foreign-financed, according to the following description. "With respect to private life insurance company, please take it as foreign-financed if all of the company name is expressed by katakana or Roman alphabet in principle. In other case, if company name is expressed by mixture of Chinese character, hiragana and katakana, please take it as domestic. Note that the following four companies are exceptions: Aoba (foreign-financed), Orix (domestic), Sony (domestic), T&D financial (domestic). "

in the case of Kampo. This result reflects that Kampo provides safe products with a government guarantee[9]. With respect to amount of financial assets, it shows significant positive sign only in the case of Kampo. However, as stated before, this variable also includes "amount of funding saving-based insurance," so it is difficult to provide a clear interpretation.

Next consider the estimation result for demand function on amount of insurance (upper part). Both the amount of income and amount of financial assets have a significant positive sign. This means that households with higher incomes and more financial assets need larger amounts of insurance[10]. With the demand function for the private domestic private insurance company, the age of the household head has a significant negative sign. Generally, people tend to purchase more security-oriented insurance when they are young, so this result is understandable. Urata et al. (1999) also report a similar result, with a significant positive sign for the "less than 40 age" dummy. Further, the public officials dummy has a significant negative sign. This may reflect that public officials do not have to buy much security-oriented insurance because of better job security. Public officials also join in mutual-aid pension plan. This pension plan has some advantages in comparison with other pension plans joined by employees and the self-employed[11]. In other words, public officials can get more pensions and so they tend to buy smaller amounts of insurance. On the other hand, the pension dummy shows significant positive sign only in the case of Kampo. This might reflect the fact that aged people tend to have a greater amount of endowment insurance.

The three variables (comparison of insurance firms' dummy variable, knowledge on amendment of insurance business law dummy, bankruptcy experience dummy) that are prepared as proxies of financial instability, they seem not to affect on the decision for purchasing amount of insurance. On the other hand, in deciding whether to purchase life insurance products, the knowledge dummy shows a significant positive sign in the cases of both domestic private life insurance companies and Kampo. In addition, bankruptcy experience dummy shows a significant negative sign only in the case of Kampo. In other words, households that have experienced bankruptcy within a decade tend to increase the probability of purchase insurance products supplied by Kampo, which provide safer products. From this result, we can say that recent financial instability and a sense of future

[9] According to the questionnaire conducted by Ministry of Internal Affairs and Communications in 2004 (URL：http://www.soumu.go.jp/s-news/2004/040817_1.html), the two top reasons for purchasing Kampo are "feel safety because Kampo is sold by Japanese government" and "Japanese government guarantees to pay the insurance money".

[10] In the questionnaire, there is a question concerning the amount of debt. After transforming the class value alternative into a yen amount, we estimate the demand function but obtain a significant positive sign. This might be because the "amount of debt" includes housing loan, so household with higher income tend to have a similar amount of debt and this leads to a positive sign. Urata et al. (1999) also point out this possibility. However, this type of "debt" differs from the ordinary meaning of debt, so we report the estimation result excluding the amount of debt.

[11] For example, a mutual-aid pension plan has additional payments scheme. Moreover, the range of relatives that can obtain the survivor's pension from a mutual-aid pension is wider than that of other pension plans.

uncertainty surely affect insurance purchasing behavior of Japanese households. Thus, the household needs to buy more insurance products if it is faced with bankruptcy because its insurance money may lower. However, according to the data, more than 50% of household heads who experienced bankruptcy are more than 50 years in age so that they may not be able to buy more insurance products. Even if they want to buy the insurance products, the insurance firms may refuse to contract or require paying very high insurance premiums. On the other hand, it is relatively easy for them to buy Kampo because Japan Post does not monitor each individual.[12] To sum up, the households that have experienced bankruptcy tend to purchase Kampo because the age of the household head is relatively high.

5. Simultaneous Estimation

5. 1 Portfolio of Life Insurance Products

In the previous section, we estimated the demand functions of life insurance products offered by private domestic insurance companies and Kampo. However, household tends to hold multiple life insurance products simultaneously. In consideration of this fact, we attempt to devise an improvement for the more precise estimation using the same data.

Table 4 shows household portfolio pattern of life insurance products based on the entire questionnaire sample. Each pattern is ranked in descending order. We see that "household which has only product offered by private domestic insurance company" is ranked as No. 1 and "household which has only product offered by Kampo" is ranked as No. 3. It proves that both products surely play an important role in Japanese households. On the other hand, there exists "household which has both products offered by private domestic insurance company and Kampo" and is ranked as No. 2. In addition, there are many other patterns for household to have multiple products offered by different institution. Therefore, in this section, we estimate and examine simultaneous equation with respect to decision on whether purchasing insurance products offered by private domestic insurance company and Kampo.

----------Insert Table 4 about here ----------

5. 2 Method for Simultaneous Estimation

Following the above formulation, there are two possible ways to estimate simultaneous equations.

Case 1: In the case of allowing correlation between two life insurance holding function

We use a simultaneous Probit model for estimating life insurance holding function. In short, we

[12] Of course, it does not mean that Japan Post contracts without any conditions.

use the same setting as the previous section in estimating holding function, but here we allow for correlation of the error term between two equations with respect to private domestic insurance company and Kampo. We assume the distribution of error terms is expressed by the BVN (Bivariate Standard Normal Distribution). The formulation is as follows.

$$\begin{cases} y_1^* = x_1'\boldsymbol{\beta}_1 + \varepsilon_1, \quad y_1 = 1 \quad if \quad y_1^* > 0, \quad \text{otherwise } 0 \\ y_2^* = x_2'\boldsymbol{\beta}_2 + \varepsilon_2, \quad y_2 = 1 \quad if \quad y_2^* > 0, \quad \text{otherwise } 0 \\ \text{Note that } [\varepsilon_1, \varepsilon_2] \sim BVN(0,0,1,1,\rho), \ \rho : \text{correlation coefficient.} \end{cases}$$

Case 2: In the case of holding two kinds of products simultaneously offered by private domestic Insurance company and Kampo

The base settings are almost the same as case 1, but we employ an additional assumption that we can observe (y_1, x_1) in the first equation only when household purchases life insurance product in the second equation (in other words, $y_2 = 1$). In the context of our analysis, this means that we examine the factors for holding life insurance product offered by private domestic insurance company in the first equation, and examine the factors affecting why purchasing households also purchase a Kampo product in the second equation. This factor analysis corresponds to the largest simultaneous holding pattern in Table 4.

5. 3 Estimation Results and Interpretation

Our estimation result is shown in Table 5.

Case 1 shows the result of estimating the two holding functions in Table 3 simultaneously, while allowing for correlation between the error terms. The correlation coefficient ρ is 0.172. The sign and significance of coefficient shows almost the same tendency as lower part in Table 3, reflecting a low correlation. On the other hand, case 2 shows factors indicating that household with private life insurance product also purchase Kampo product. The ratio of households holding private life insurance product is about 62%, and the ratio of household holding Kampo product simultaneously is about 37%. We can say that income or the children dummy is not as important factor for additional holding of Kampo product although private life insurance holding function in the first stage shows almost the same tendency. In addition, the bankruptcy experience dummy shows positive sign, but is insignificant in the second equation.

Further, knowledge dummy shows rather significant negative sign. This result can be interpreted as follows. The question in the questionnaire is that “the life insurance firms could change assumed interest rate before bankruptcy in accordance with amendment of insurance law since 24 August,

2003. Do you know that?"[13] This questionnaire conducted from 29 November to 21 December 2003.[14] There were no insurance firms to apply such lowering. Thus, it is rather difficult to get that knowledge unless they are familiar with financial information in their daily life. In other words, knowledge dummy represents not only the knowledge about amendment of insurance law, but also more general knowledge about financial institutions and markets.

We can obtain two reasons households that have the knowledge about amendment of insurance law do not purchase Kampo additionally. First, Kampo contains more saving factors than private life insurance products. Thus, these households want to invest not in Kampo, but in other financial assets that do not fix their money. Second, it is natural to think that these households purchased private life insurance products more properly because they have financial knowledge[15]. Thus, they may not need to purchase more insurance product to adjust to their needs.

----------Insert Table 5 about here ----------

6. Concluding Remarks

This paper estimated private life insurance and Kampo demand functions using household-level data offered by Postal Services Research Institute. Our results show that that the income, child, pension, knowledge factors have a significant effect on the decision whether each household purchases life insurance products. The bankruptcy experience variable appears to have impact only in the case of Kampo.

However, pension and bankruptcy experience appears only to have an impact on Kampo, while aged (less than 40) and occupational (civil servant) factors affect only private life insurance. Dummy variables representing comparison, knowledge, and bankruptcy experience did not have any significant effect on decisions concerning private life insurance. Simultaneous estimations are also used to examine why households that already have one type of life insurance product (e.g. private life insurance) purchase the other type of life insurance product (e.g. Kampo). The results indicate that income, child, and bankruptcy experience variables are not a significant factor when households with private life insurance product decide to purchase additional Kampo. The results also show that a knowledge dummy has a negative impact on additional purchases.

In relation to recent financial instability, this analysis shows the following results. First, the existence of financial instability has not impacted on insurance funds, but the knowledge factor has some impact on the purchasing decision. Second, households which experienced bankruptcy before have a tendency to Kampo rather than private life insurance. These results imply that financial

[13] This question was originally written in Japanese.
[14] This amended insurance law passed in the Diet on 18 July 2003.
[15] Tanaka (1999) has investigated this point using an empirical approach.

instability in Japan affects households' decisions.

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Table 1　Descriptive Statistics

	Mean	S.D.	Min	Max
Dependent Variables				
Amount of Insurance (Domestic Private)	2531	3542	0	40200
Holding insurance dummy (Domestic Private)	0.6203	0.4854	0	1
Amount of Insurance (Kampo)	296	891	0	19998
Holding insurance dummy (Kampo)	0.3164	0.4652	0	1
Holding insurance dummy (All)	0.7725	0.4194	0	1
Explanatory Variables				
Amount of income	626.75	458.87	100	5000
Amount of financial asset	804.04	1309.65	100	10000
Age of household head	43.54	10.32	20	59
Owner occupied house dummy	0.2480	0.4320	0	1
Public officials dummy	0.0908	0.2874	0	1
Large-scale firm dummy	0.1786	0.3831	0	1
Pension dummy	0.1811	0.3852	0	1
Comparison of insurance companies dummy	0.0210	0.1433	0	1
Knowledge dummy	0.4716	0.4993	0	1
Bankrupt experience dummy	0.1652	0.3714	0	1
Occupation of non-household head dummy	0.9666	0.1798	0	1
Children dummy	0.6437	0.4790	0	1
Metropolitan dummy	0.6113	0.4876	0	1

Table 2: Correlation Matrix

Explanatory Variables (number of observations 2004)	Amount of income	Amount of financial asset	Age of household head	Owner occupied house dummy	Public officials dummy	Large-scale firm dummy	Pension dummy	Comparison dummy	Knowledge dummy	Bankrupt experience dummy	Occupation of non-household head dummy	Children dummy	Metropolitan dummy
Amount of income	1.0000												
Amount of financial asset	0.4895	1.0000											
Age of household head	0.3205	0.2918	1.0000										
Owner occupied house dummy	0.2088	0.3287	0.3772	1.0000									
Public officials dummy	0.1973	0.0780	0.0555	0.0316	1.0000								
Large-scale firm dummy	0.1537	0.0680	-0.0576	-0.0748	-0.1474	1.0000							
Pension dummy	0.1447	0.1665	0.2263	0.2639	0.0362	-0.0705	1.0000						
Comparison of insurance companies dummy	-0.0192	-0.0314	-0.0387	-0.0356	-0.0099	0.0318	-0.0326	1.0000					
Knowledge dummy	0.1955	0.2046	0.1483	0.0570	0.0945	0.1179	0.0411	0.0223	1.0000				
Bankrupt experience dummy	0.1034	0.0960	0.0976	0.0775	0.0465	0.0030	0.0490	-0.0088	0.1021	1.0000			
Occupation of non-household head dummy	0.0514	-0.0109	0.0643	0.0104	-0.0088	0.0215	0.0154	0.0078	-0.0078	0.0154	1.0000		
Children dummy	0.2429	0.0764	0.2023	0.0967	0.0248	0.0532	0.1199	0.0434	0.0495	0.0475	0.0761	1.0000	
Metropolitan dummy	-0.0678	-0.0474	0.0798	0.1000	0.1095	-0.1091	0.1066	0.0023	-0.0793	0.0487	-0.0173	0.0288	1.0000

Table 3: Estimation Results of Life Insurance Demand Function

Explanatory Var.	Private Domestic			Kampo		
	Coef.	z-value		Coef.	z-value	
	Dependent: Amount of insurance			Dependent: Amount of insurance		
Amount of income	2.225	8.698	***	0.348	2.793	***
Amount of financial asset	0.278	3.139	***	0.111	2.546	**
Age of household head	-34.709	-2.898	***	-2.018	-0.296	
Owner occupied house dummy	-102.531	-0.412		-124.083	-0.988	
Public officials dummy	-622.381	-1.760	*	139.473	0.813	
Large-scale firm dummy	44.168	0.174		-186.869	-1.231	
Pension dummy	209.624	0.806		328.158	2.479	**
Comparison of insurance companies dummy	109.930	0.147		302.205	0.881	
Knowledge dummy	-289.397	-1.350		-183.701	-1.621	
Bankrupt experience dummy	46.566	0.176		-38.905	-0.289	
Constant	4606.360	8.040	***	907.473	2.283	**
	Dependent: Holding insurance			Dependent: Holding insurance		
Amount of income	0.001	5.708	***	0.000	2.329	**
Amount of financial asset	0.000	-0.267		0.000	2.780	***
Occupation of non-household head dummy	-0.056	-0.349		0.067	0.386	
Children dummy	0.429	6.903	***	0.579	8.475	***
Metropolitan dummy	-0.038	-0.620		0.090	1.425	
Pension dummy	0.142	1.771	*	0.257	3.341	***
Comparison of insurance companies dummy	-0.266	-1.342		0.163	0.803	
Knowledge dummy	0.336	5.550	***	0.162	2.603	***
Bankrupt experience dummy	0.037	0.454		0.186	2.338	**
Constant	-0.363	-2.145	***	-1.336	-7.256	***
ρ	-0.293			-0.128		
σ	3571			1342		
λ	-1047			-171		
Ratio of selected household (%)	62.03%	(=1243/2004)		31.64%	(=634/2004)	
Log-likelihood	-14133			-6625		

*** : Significant at 1% level
** : Significant at 5% level
* : Significant at 10% level

Table 4: Combination of Life Insurance Products

	Combination	Number of Household	Ratio (%)
1	Private (domestic) only	969	23.17%
2	Private (domestic) and Kampo	767	18.34%
3	Kampo only	295	7.05%
4	Private (domestic & foreign) and Kampo	174	4.16%
5	Private (domestic) and Kampo and JA mutual	164	3.92%
6	Private (domestic & foreign)	159	3.80%
7	mutual	118	2.82%
8	Private (domestic) and Other mutual	97	2.32%
9	Private (domestic) and JA mutual	95	2.27%
10	Private (foreign) only	91	2.18%
11	JA mutual only	90	2.15%
12	Kampo and JA mutual	87	2.08%
13	Other mutual only	66	1.58%
14	Private (foreign) and Kampo	58	1.39%

Table 5: Simultaneous Estimation Results of Life Insurance Holding Function

Case 1: Simultaneous Estimation of Holding Private Domestic and Kampo

Explanatory Var.	Private Domestic			Kampo		
	Coef.	z-value		Coef.	z-value	
	Dependent: Holding insurance			Dependent: Holding insurance		
Amount of income	0.000	6.356	***	0.000	2.436	**
Amount of financial asset	0.000	-0.220		0.000	2.910	***
Occupation of non-household head dummy	-0.038	-0.224		0.062	0.366	
Children dummy	0.403	6.405	***	0.580	8.420	***
Metropolitan dummy	-0.054	-0.867		0.095	1.496	
Pension dummy	0.143	1.782	*	0.256	3.400	***
Comparison of insurance companies dummy	-0.253	-1.293		0.169	0.845	
Knowledge dummy	0.336	5.590	***	0.164	2.617	***
Bankrupt experience dummy	0.043	0.537		0.185	2.300	**
Constant	-0.337	-1.893	*	-1.337	-7.408	***
ρ	0.172	4.406	***			
Ratio of selected household (%)	62.03%	(=1243/2004)		31.64%	(=634/2004)	
Log-likelihood	-2396.355					

*** : Significant at 1% level
** : Significant at 5% level
* : Significant at 10% level

Case 2: Estimation for Household with Private Domestic to Purchase Kampo Additionally

Explanatory Var.	Private Domestic			Kampo		
	Coef.	z-value		Coef.	z-value	
	Dependent: Holding insurance			Dependent: Holding insurance		
Amount of income	0.000	6.175	***	0.000	-0.933	
Amount of financial asset	0.000	0.319		0.000	2.541	**
Occupation of non-household head dummy	-0.045	-0.265		0.048	0.289	
Children dummy	0.403	6.420	***	0.064	0.732	
Metropolitan dummy	-0.051	-0.841		0.060	0.975	
Pension dummy	0.151	1.959	*	0.143	1.852	*
Comparison of insurance companies dummy	-0.260	-1.346		0.138	0.662	
Knowledge dummy	0.322	5.393	***	-0.148	-2.325	*
Bankrupt experience dummy	0.033	0.417		0.115	1.448	
Constant	-0.319	-1.809	*	0.152	0.784	
ρ	-0.965	-23.586	***			
Ratio of selected household (%)	62.03%	(=1243/2004)		37.41%	(=465/1243)	
Log-likelihood	-2010.777					

*** : Significant at 1% level
** : Significant at 5% level
* : Significant at 10% level